



Operating Manual

Ultrasonic proximity switch with one switching output and IO-Link

- pico+15/F/A      pico+15/WK/F/A
- pico+25/F/A      pico+25/WK/F/A
- pico+35/F/A      pico+35/WK/F/A
- pico+100/F/A      pico+100/WK/F/A

Product description

The pico+ sensor offers a non-contact measurement of the distance to an object which must be positioned within the sensor's detection zone. The switching output is set conditional upon the adjusted detect distance. Via the Teach-in procedure, the detect distance and operating mode can be adjusted. Two LEDs indicate the state of the switching output.

IO-Link

The pico+ sensors are IO-Link-capable in accordance with IO-Link specification V1.1 and support Smart Sensor Profile like Digital Measuring Sensor.

Safety instructions

- Read the operating manual prior to start-up.
- Connection, installation and adjustments may only be carried out by qualified staff.
- No safety component in accordance with the EU Machine Directive, use in the area of personal and machine protection not permitted.

Use for intended purpose only

pico+ ultrasonic sensors are used for non-contact detection of objects.

Installation

- Mount the sensor at the place of fitting.
- Connect a connection cable to the M12 device plug, see Fig. 1.

microsonic notation		IO-Link notation	IO-Link Smart Sensor Profile	colour
1	+U <sub>B</sub>	L+	SSC1	brown
2	–	NC		white
3	–U <sub>B</sub>	L–		blue
4	F	C/Q		black
5	Com	NC		grey

Fig. 1: Pin assignment with view onto sensor plug, IO-Link notation and colour coding of the microsonic connection cables.

Start-up

- Connect the power supply.
- Carry out sensor adjustment in accordance with Diagram 1.

Factory setting

- Switching point operation
- Switching output on NOC
- Detect distance at operating range
- Multi-function input »Com« set to »Teach-in« and »synchronisation«
- Filter at F01
- Filter strength at P00

Operating modes

Three operating modes are available for the switching output:

- Operation with one switching point**  
The switching output is set when the object falls below the set switching point.
- Window mode**  
The switching output is set when the object is outside the set window.

- Two-way reflective barrier**  
The switching output is set when the object is between sensor and fixed reflector.

Synchronisation

If the assembly distance of multiple sensors falls below the values shown in Fig. 2, the internal synchronisation should be used. For this purpose set the switching outputs of all sensors in accordance with Diagram 1. Then switch-on the multi-function output »Com« to »Teach-in« and »synchronisation« (see »Further settings«, Diagram 1). Finally interconnect each pin 5 of the sensors to be synchronised.

pico+15...	≥0.25 m	≥1.30 m
pico+25...	≥0.35 m	≥2.50 m
pico+35...	≥0.40 m	≥2.50 m
pico+100...	≥0.70 m	≥4.00 m

Fig. 2: Assembly distances.

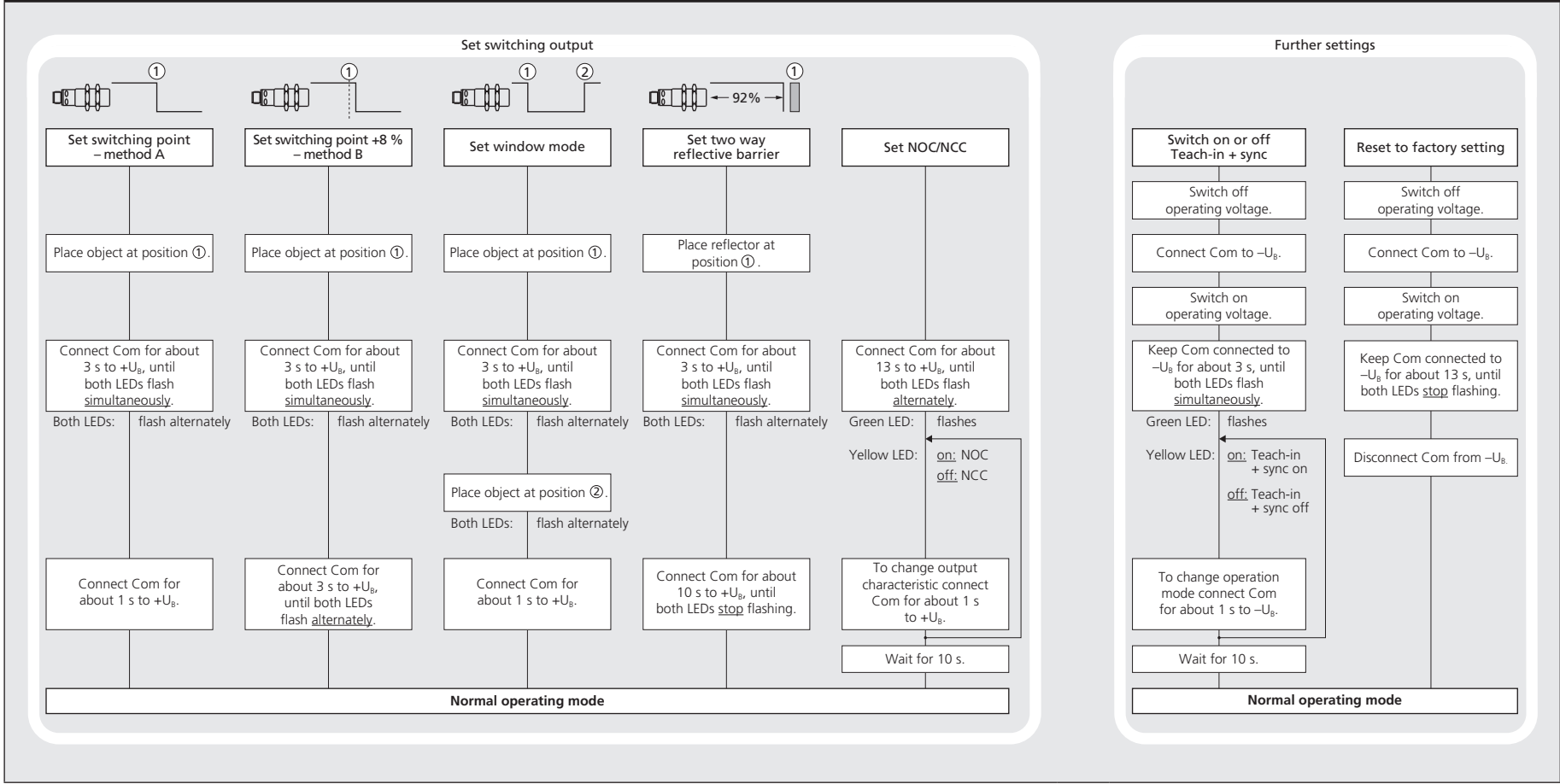
Maintenance

microsonic sensors are maintenance-free. In case of excess caked-on dirt we recommend cleaning the white sensor surface.

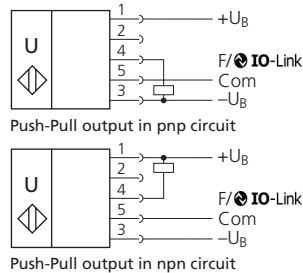
Notes



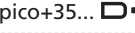

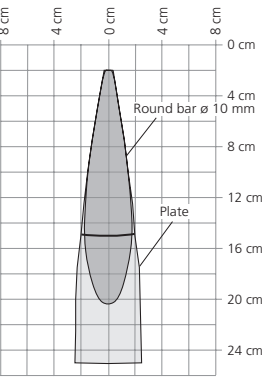
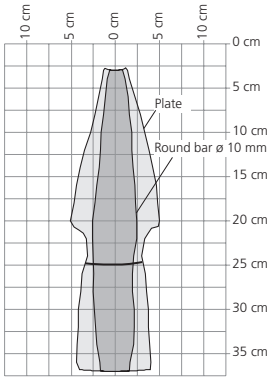
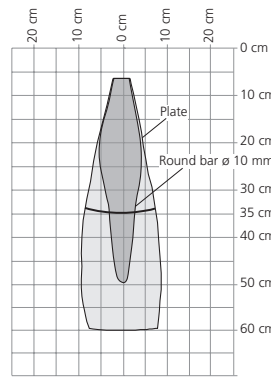
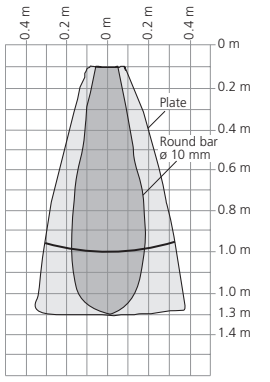
- The sensors of the pico+ family have a blind zone, within which a distance measurement is not possible.
- The pico+ sensors are equipped with an internal temperature compensation. Due to the sensors self heating, the temperature compensation reaches its optimum working-point after approx. 120 seconds of operation.
- In the normal operating mode, an illuminated yellow LED signals that the switching output is switched through.
- In the »Two-way reflective barrier« operating mode, the object has to be within the range of 0 to 92 % of the set distance.

Diagram 1: Set sensor parameters via Teach-in procedure



# Technical data



	pico+15... 	pico+25... 	pico+35... 	pico+100... 
<b>blind zone</b>	20 mm	30 mm	65 mm	120 mm
<b>operating range</b>	150 mm	250 mm	350 mm	1,000 mm
<b>maximum range</b>	250 mm	350 mm	600 mm	1,300 mm
<b>angle of beam spread</b>	see detection zone	see detection zone	see detection zone	see detection zone
<b>transducer frequency</b>	380 kHz	320 kHz	400 kHz	200 kHz
<b>resolution</b>	0.1 mm	0.1 mm	0.1 mm	0.1 mm
<b>reproducibility</b>	±0.15 %	±0.15 %	±0.15 %	±0.15 %
<b>detection zones</b>				
<b>accuracy</b>	±1 % (temperature drift internally compensated)	±1 % (temperature drift internally compensated)	±1 % (temperature drift internally compensated)	±1 % (temperature drift internally compensated)
<b>operating voltage <math>U_B</math></b>	10 bis 30 V DC, reverse polarity protection (Class 2)	10 bis 30 V DC, reverse polarity protection (Class 2)	10 bis 30 V DC, reverse polarity protection (Class 2)	10 bis 30 V DC, reverse polarity protection (Class 2)
<b>voltage ripple</b>	±10 %	±10 %	±10 %	±10 %
<b>no-load current consumption</b>	<40 mA	<40 mA	<40 mA	<40 mA
<b>housing</b>	brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content	brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content	brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content	brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content
<b>max. tightening torque of nuts</b>	15 Nm	15 Nm	15 Nm	15 Nm
<b>class of protection per EN 60529</b>	IP 67	IP 67	IP 67	IP 67
<b>type of connection</b>	5-pin M12 circular plug	5-pin M12 circular plug	5-pin M12 circular plug	5-pin M12 circular plug
<b>controls</b>	Teach-in via pin 5 (Com)	Teach-in via pin 5 (Com)	Teach-in via pin 5 (Com)	Teach-in via pin 5 (Com)
<b>indicators</b>	LED green, LED yellow	LED green, LED yellow	LED green, LED yellow	LED green, LED yellow
<b>programmable</b>	Teach-in, LinkControl, IO-Link	Teach-in, LinkControl, IO-Link	Teach-in, LinkControl, IO-Link	Teach-in, LinkControl, IO-Link
<b>synchronisation</b>	internal synchronisation up to 10 sensors	internal synchronisation up to 10 sensors	internal synchronisation up to 10 sensors	internal synchronisation up to 10 sensors
<b>operating temperature</b>	-25 to +70 °C	-25 to +70 °C	-25 to +70 °C	-25 to +70 °C
<b>storage temperature</b>	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C
<b>switching output</b>	Push-Pull, $U_B$ -3 V, $-U_B$ +3 V, $I_{max}$ = 100 mA switchable NOC/NCC, short-circuit-proof	Push-Pull, $U_B$ -3 V, $-U_B$ +3 V, $I_{max}$ = 100 mA switchable NOC/NCC, short-circuit-proof	Push-Pull, $U_B$ -3 V, $-U_B$ +3 V, $I_{max}$ = 100 mA switchable NOC/NCC, short-circuit-proof	Push-Pull, $U_B$ -3 V, $-U_B$ +3 V, $I_{max}$ = 100 mA switchable NOC/NCC, short-circuit-proof
<b>switching hysteresis</b> <sup>1)</sup>	2 mm	3 mm	5 mm	20 mm
<b>switching frequency</b> <sup>2)</sup>	25 Hz	25 Hz	12 Hz	10 Hz
<b>response time</b> <sup>2)</sup>	32 ms	32 ms	64 ms	80 ms
<b>time delay before availability</b>	<300 ms	<300 ms	<300 ms	<300 ms
<b>norm conformity</b>	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
<b>order no. directly radiating weight</b>	<b>pico+15/F/A</b> 30 g	<b>pico+25/F/A</b> 30 g	<b>pico+35/F/A</b> 30 g	<b>pico+100/F/A</b> 30 g
<b>order no. angular head weight</b>	<b>pico+15/WK/F/A</b> 35 g	<b>pico+25/WK/F/A</b> 35 g	<b>pico+35/WK/F/A</b> 35 g	<b>pico+100/WK/F/A</b> 35 g

<sup>1)</sup> Can be programmed via LinkControl and IO-Link.  
<sup>2)</sup> With LinkControl and IO-Link, the selected filter setting influences the switching frequency and response time.

- In the »Set switching point – method A« Teach-in procedure the actual distance to the object is taught to the sensor as the detect point. If the object moves towards the sensor (e.g. with level control) then the taught distance is the level at which the sensor has to switch the output.
- If the object to be scanned moves into the detection area from the side, the »Set switching point +8 % – method B« Teach-in procedure should be used. In this way the switching distance is set 8 % further than the actual measured distance to the object. This ensures a reliable switching distance even if the height of the objects varies slightly.

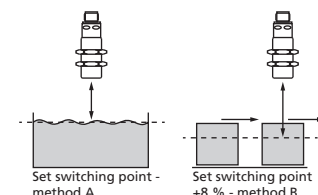


Fig. 3: Setting the switching point for different directions of movement of the object

- The sensor can be reset to its factory setting (see »Further settings«).
- Using the LinkControl adapter (optional accessory) and the LinkControl software for Windows®, all Teach-in and additional sensor parameter settings can be optionally adjusted.
- The pico+ sensors have a push-pull switching output.
- The latest IODD file and informations about start-up and configuration of pico+ sensors with IO-Link, you will find online at [www.microsonic.de/en/pico+](http://www.microsonic.de/en/pico+).



Enclosure Type 1  
 For use only in industrial  
 machinery NFPA 79 applications.

The proximity switches shall be used with a  
 Listed (CULV7) cable/connector assembly rated  
 minimum 32 Vdc, minimum 290 mA, in  
 the final installation.



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